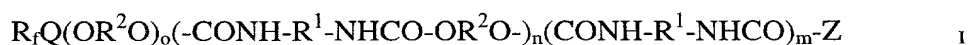


We Claim:

1. Fluorochemical urethane composition comprising:  
one or more oligomers comprising (i) at least one fluorine-containing repeatable unit and (ii) at least one fluorine-containing terminal group, and wherein said compounds or oligomers comprise the condensation reaction product of:
  - (a) one or more fluorinated polyols;
  - (b) one or more polyisocyanates; and
  - (c) one or more monofunctional fluorine-containing compounds comprising one functional group that is reactive with the hydroxyl group of said polyol (a) or with the isocyanate group of the polyisocyanate (b).
2. The oligomers of claim 1 further comprising the reaction product of one or more water-solubilizing compounds comprising one or more water solubilizing groups and at least one electrophilic or nucleophilic moiety, said solubilizing groups independently pendant from the repeating unit, or terminal portion.
3. The water solubilizing compounds of claim 2 wherein said water-solubilizing group is selected from the group consisting of carboxylate, sulfate, sulfonate, phosphonate, ammonium, and quaternary ammonium groups.
4. The oligomers of claim 1 further comprising the reaction product of one or more polymerizable compounds comprising one or more polymerizable groups and at least one electrophilic or nucleophilic moiety, said polymerizable groups independently pendant from the repeating unit, or terminal portion.
5. The polymerizable compounds of claim 4, wherein said polymerizable groups are selected from the group consisting of acrylate, methacrylate, vinyl allyl, and glycidyl groups.

6. The compounds of claim 1 having the formula



wherein:

n is a number from 1 to 10, inclusive,

o is a number from 0 to 1, inclusive;

m is a number from 0 to 1, inclusive

$R_f$  is selected from the group consisting of perfluoroalkyl groups having 1 to 12 carbon atoms, and perfluoroheteroalkyl groups having 3 to about 50 carbon atoms;

Q is a divalent linking group;

$R^1$  is a divalent organic group which is the residue of a polyisocyanate;

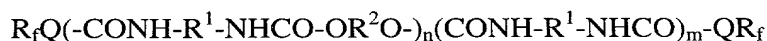
$R^2$  is a divalent organic group which is a residue of the polyol, at least a portion of which is substituted one or more perfluoroalkyl groups, perfluoroheteroalkyl groups, perfluoroheteroalkylene groups, or mixtures thereof;

Z is  $R_fQ-$ , a water-solubilizing group or a polymerizable group.

7. The oligomer of claim 6, wherein Q is selected from the following structures, wherein each k is independently an integer from 0 to about 20,  $R_1'$  is hydrogen, phenyl, or alkyl of 1 to about 4 carbon atoms, and  $R_2'$  is alkyl of 1 to about 20 carbon atoms:

$-\text{SO}_2\text{NR}_1'(\text{CH}_2)_k\text{O}(\text{O})\text{C}-$	$-\text{CONR}_1'(\text{CH}_2)_k\text{O}(\text{O})\text{C}-$
$-(\text{CH}_2)_k\text{O}(\text{O})\text{C}-$	$-\text{CH}_2\text{CH}(\text{OR}_2')\text{CH}_2\text{O}(\text{O})\text{C}-$
$-(\text{CH}_2)_k\text{C}(\text{O})\text{O}-$	$-(\text{CH}_2)_k\text{SC}(\text{O})-$
$-(\text{CH}_2)_k\text{O}(\text{CH}_2)_k\text{O}(\text{O})\text{C}-$	$-(\text{CH}_2)_k\text{S}(\text{CH}_2)_k\text{O}(\text{O})\text{C}-$
$-(\text{CH}_2)_k\text{SO}_2(\text{CH}_2)_k\text{O}(\text{O})\text{C}-$	$-(\text{CH}_2)_k\text{S}(\text{CH}_2)_k\text{OC}(\text{O})-$
$-(\text{CH}_2)_k\text{SO}_2\text{NR}_1'(\text{CH}_2)_k\text{O}(\text{O})\text{C}-$	$-(\text{CH}_2)_k\text{SO}_2-$
$-\text{SO}_2\text{NR}_1'(\text{CH}_2)_k\text{O}-$	$-\text{SO}_2\text{NR}_1'(\text{CH}_2)_k-$
$-(\text{CH}_2)_k\text{O}(\text{CH}_2)_k\text{C}(\text{O})\text{O}-$	$-(\text{CH}_2)_k\text{SO}_2\text{NR}_1'(\text{CH}_2)_k\text{C}(\text{O})\text{O}-$
$-(\text{CH}_2)_k\text{SO}_2(\text{CH}_2)_k\text{C}(\text{O})\text{O}-$	$-\text{CONR}_1'(\text{CH}_2)_k\text{C}(\text{O})\text{O}-$
$-(\text{CH}_2)_k\text{S}(\text{CH}_2)_k\text{C}(\text{O})\text{O}-$	$-\text{CH}_2\text{CH}(\text{OR}_2')\text{CH}_2\text{C}(\text{O})\text{O}-$
$-\text{SO}_2\text{NR}_1'(\text{CH}_2)_k\text{C}(\text{O})\text{O}-$	$-(\text{CH}_2)_k\text{O}-$
$-\text{C}_k\text{H}_{2k}-\text{OC}(\text{O})\text{NH}-$	$-\text{C}_k\text{H}_{2k}-\text{NR}_1'\text{C}(\text{O})\text{NH}-$
$-\text{OC}(\text{O})\text{NR}'(\text{CH}_2)_k-$	$-(\text{CH}_2)_k\text{NR}_1'-$ and
$-(\text{CH}_2)_k\text{NR}_1'\text{C}(\text{O})\text{O}-$	

8. The oligomers of claim 1 comprising compounds of the Formula:



wherein:

n is a number from 1 to 10 inclusive;

m is 1;

R<sub>f</sub> is a perfluoroalkyl group having 1 to 12 carbon atoms, or a perfluoroheteroalkyl group having 3 to about 50 carbon atoms with all perfluorocarbon chains present having 1 to 6;

Q is -C<sub>k</sub>H<sub>2k</sub>-OC(O)NH- or -C<sub>k</sub>H<sub>2k</sub>-NRC(O)NH-, wherein R<sub>1</sub>' is H or lower alkyl, and k is an integer from 0 to about 20;

R<sup>1</sup> is a straight chain alkylene, of 1 to 14 carbon atoms;

R<sup>2</sup> is a polyvalent organic group which is a residue of the polyol, that is a straight or branched chain alkylene, cycloalkylene, arylene or heteroalkylene group of 1 to 14 carbon atoms, preferably 1 to 8 carbon atoms, more preferably 1 to 4 carbon atoms, and most preferably two carbon atoms, or an arylene group of 6 to 12 carbon atoms; at least a portion of R<sup>2</sup> groups are substituted with or contain one perfluoroalkyl group, perfluoroheteroalkyl group, perfluoroheteroalkylene group, or mixtures thereof.

9. The composition of claim 1 wherein the oligomer comprises the condensation reaction product of one or more fluorinated polyols, one or more non-fluorinated polyols, one or more polyisocyanates and one or more monofunctional fluorine-containing compounds.

10. The composition of claim 1 wherein the oligomer comprises the condensation reaction product of one or more fluorinated polyols, an excess amount (relative to the polyol) of one or more linear alkylene diisocyanates, and sufficient fluorinated monoalcohols to react with the terminal isocyanate groups

11. The fluorochemical composition of Claim 1 wherein the fluorine containing group of said polyol is a perfluoroalkyl group of 1 to 12 carbon atoms.

12. The fluorochemical composition of Claim 1 wherein the fluorine containing group of said polyol is a perfluoroalkyl group of 3 to 5 carbon atoms.

13. The fluorochemical composition of Claim 1 wherein the fluorine containing group of said polyol is a perfluoroalkyl group of is perfluorobutyl.

14. The fluorochemical composition of Claim 1 wherein the monofunctional fluorine-containing compound is a compound of the following formula I:



wherein:

$R_f$  is selected from the group consisting of perfluoroalkyl group having 1 to 12 carbon atoms, and perfluoroheteroalkyl group having 3 to about 50 carbon atoms with all perfluorocarbon chains present having 6 or fewer carbon atoms;

$Q'$  is a functional group that is reactive with the terminal isocyanate of the polyisocyanate or terminal hydroxy group of the polyol.

15. The monofunctional fluorine-containing compound of claim 14 wherein  $Q'$  is selected from hydroxyl, secondary amino, oxazolonyl, oxazolonyl, acetyl, acetonyl, carboxyl, isocyanato, epoxy, aziridinyl, thio, and acyl halide groups.

16. The fluorochemical composition of claim 1 wherein said fluorochemical oligomer further comprises the reaction product of one or more non-fluorinated polyols.

17. A coating composition comprising a mixture comprising:

- (a) a solvent; and
- (b) the fluorochemical composition of Claim 1.

18. The coating composition of claim 17 wherein the fluorochemical composition further comprises one or more water-solubilizing groups.

19. The coating composition of claim 18 wherein said mixture comprises an aqueous solution, dispersion or suspension.

20. An article comprising:
- (a) a substrate having one or more surfaces; and
- the fluorochemical composition of Claim 1 coated on one or more surfaces of said substrate.
21. The article of Claim 20 wherein the fluorochemical composition further comprises one or more water-solubilizing groups.
22. The article of Claim 20 wherein the fluorochemical composition further comprises one or polymerizable groups.
23. The article of Claim 20 wherein the substrate is selected from the group consisting of hard substrates and fibrous substrates.
24. A method of imparting repellency to a substrate, having one or more surfaces, comprising the steps of :
- applying the coating composition of claim 17 onto one or more surfaces of said substrate; and
  - curing the coating composition at ambient or elevated temperature.
25. A polymer composition comprising:
- (a) the fluorochemical composition of claim 1; and
  - (b) at least one thermoplastic or thermoset polymer.
26. The composition of Claim 25 wherein said thermoplastic polymer is selected from the group consisting of polypropylene, polyethylene, polyacrylates, polymethacrylates, copolymers of ethylene and one or more alpha-olefins, polyesters, polyurethanes, polycarbonates, polyetherimides, polyimides, polyetherketones, polysulfones, polystyrenes, ABS copolymers, polyamides, fluoroplastics, and blends thereof; and said thermoset polymer is selected from the group consisting of

polyurethanes, epoxy resins, fluoroelastomers, polyacrylates, polymethacrylates, and unsaturated polyesters, and blends thereof.

27. The composition of Claim 25 wherein said composition is prepared by melt blending the fluorochemical composition and the thermoplastic polymer.

28. A shaped article comprising the polymer composition of claim 25, wherein said shaped article is selected from fibers, films, and molded articles.

29. A process for preparing shaped article comprising the steps of:

- (a) combining the fluorochemical composition of claim 1 and at least one thermoplastic polymer; and
- (b) melt processing the resulting combination.